WELL SUMMARY page 1 of 4

Location ID: PL-1-486 Field Representative(s): R. Cooper, J. Kaszuba

Northing: 225709.35 Easting: 401823.62

Date Started: 7 September 1988 Date Completed: 8 October 1988

Drilling Method: Mud & Air-Foam Rotary Drilling Contractor: Larjon

Driller: J. Gower

Total Depth Borehole: 537' Total Depth Well Casing: 501.7'

Total Depth Surface Casing: 103'

Diameter Well Casing: 4" Diameter Surface Casing: 10"

Length of Bottom Blank: 5.3'

Type of Screen: 10' extra strength 0.02 slot

Screen Interval: 486.0' to 496.4'

Water First Detected: 482' (below grade) Water Level Open Borehole: 446.3' (below grade)

Water Level Cased Borehole:

Quik-Foam Use:

Estimated Water Use: 8325 gal. (introduced during drilling)
6100 gal. (recirculated to surface)

2225 gal. (lost to borehole)

Well Casing:

4in x 3ft SCD 40 PVC:		stock SS centralizers:	
4in x 5ft SCD 40 PVC:		custom SS centralizers:	2
4in x 10ft SCD 40 PVC:		4"x2' SS locking riser:	1
4in x 20ft SCD 40 PVC:		4" SS locking cap:	1
Total SCD 40 PVC pipe:	0 ft	4" SS female cap:	1
4in x 3ft SCD 5 SS pipe:	1		
4in x 5ft SCD 5 SS pipe:	1	4in x 5ft SCD 10 SS pipe:	1
4in x 10ft SCD 5 SS pipe:	1	4in x 10ft SCD 10 SS pipe:	1
4in x 20ft SCD 5 SS pipe:	19	4in x 20ft SCD 10 SS pipe:	4
Total SCD 5 SS pipe:	398 ft	Total SCD 10 SS pipe:	95 ft

Well Completion:

100# bags 16/40 sand:	3.5	bags
100# bags 10/20 sand:	0	bags
100# bags 8/14 sand:	0	bags
100# bags 8/20 sand:	37	bags
94# bags cement:	155	bags
5 gal. buckets bentonite:	4	buckets
50# bentonite powder:	12.75	bags

Surface Casing:

94# bags cement:	100	bags
50# bags bentonite powder:	10	bags

Pertinent Field Notes:

09/07/88 Mobilize equipment to well site; spud well with 9 7/8" bit. Drill pilot hole with mud rotary, 0-30'. - Cooper

09/08/88 Continue drilling pilot hole from 30' to 100'. Ream with 16' bit, mud rotary, from 0' to 35'. - Cooper

09/09/88 Load grout for surface casing. Continue reaming from 35' to 103'. 17 sacks mud gel and 3600 gal. water used for mud rotary drilling. Grout surface casing. - Cooper.

09/10/88 Mobilize Frank's rig from site. Steam clean CP Rig and tools, mobilize and set-up. Surface casing did not remain vertical during installation, causes slight deviation of drill string; be alert for drift problems. Drill with 9 7/8 inch bit and air-foam, 103'-270'. Monitor both compressors, use 1250 gal. water. Swelling clays at 100'-180'. - Kaszuba

09/11/88 Redrill 100'-180' with stiff-foam (5 gallons EZ-Mud added to 1800 gal. water with Quik-Foam) to combat swelling clays. Drill with 9 7/8" bit and stiff foam 270'-390'. New load of water for drilling 390'-470' contains approximately 0.5 gallons EZ-Mud in 1000 gal. water (a weak stiff-foam). Total drilled with stiff-foam and 9 7/8" bit is 270'-470'. Monitor both compressors. Use total of 2600 gal. of water. - Kaszuba

9/12/88 Drill with stiff-foam (3 gal. EZ-Mud added to 1800 gal. water with Quik-Foam), and 9 7/8" bit, 470'-532'. Core with 8" (outside diameter) Dennison core barrel 532'-537'. Recover 2" of core (approximately 3% recovery). Monitor auxiliary compressor. Use total of 875 gallons water. - Kaszuba

9/13/88 Demobilize drilling equipment and mobilize completion materials. - Kaszuba

9/14/88 Log borehole with standard suite of geophysical tools plus drift (D. Pearson, SW Surveys). Borehole drifts 35' to south. Design well to account for this drift: will use centralizers above and below screen, will not install 16/40 sand into cased borehole, pump upper plug. Install tremie pipe, bottom plug, and 100' of well casing (secure within surface casing). - Kaszuba

9/15/88 Install balance of casing and filter pack. 18' x 3 1/2" bailer runs to the bottom of the well, therefore drift is relatively smooth. Pump upper plug (2 3/4 sacks bentonite gel, 110 gal. water). - Kaszuba

9/16/88 Sound upper plug (9' thick). Sand installed on top of upper plug to above level of water production. Begin well development (see development sheet for details). Bail approximately 70 gallons, pump approximately 3200 gallons. Development parameters stable after 1000 gal., but water cloudy from bentonite (top plug must be bleeding into filter pack - 6' of 8/20 sand above the top of the screen must not have been enough). Development not complete. - Kaszuba

9/17/88 Continue development. Pump 2000 gallons. The final 560 gallons are clear. Development complete. Final pH is 7.15. Lockheed samples well. - Kaszuba

9/21/88 Begin grouting well. Air escapes from within monitor well during grout emplacement. Send bailer down well, bailer comes up with grout. Bail well until gross amounts of grout removed (150 gal). Install pump into well, pump 1500 gal. water (see development sheet for details). Initial pH of 9.10 decreases to 7.75 by the end of pumping. - Egan/Kaszuba

9/22/88 Continue pumping well. Initial pH is 8.45, final pH is 7.15 after pumping 2660 gallons (pH decreases to pre-grout levels after substantial purging).

9/27/88 Add 10 sacks of 8/20 sand to ensure no further grout leakage. Add a load of grout.

9/30/88 Add final load of grout.

10/3/88 Purge 1200 gal. from well. pH stabilizes at 7.35 after 573 gal. Lockheed samples well. In the time required to remove pump from well for sampling (1 hour), pH increased to 8.1. - Egan

10/8/88 Pour pad. - Cooper